Notes.

A NEW volume of NATURE will begin with next week's issue, so that in future each of the two volumes published annually will bear the date of a single year. This change has been decided upon for convenience of reference, and we believe it will be generally welcomed. Hitherto reference to a particular year of publication could apply to three different volumes, while the volumes which overlap the end of one year and beginning of another bear the dates of two years. Henceforward the volumes will begin respectively in January and July, and a common source of confusion will thus be avoided. The alteration means that the volume completed with this week's issue extends over four months instead of six, but the new arrangement has such decided advantages that no excuse is necessary in introducing it.

THE following have been appointed presidents and recorders (to whom all communications should be sent) of the different sections of the British Association for the meeting to be held at Hull on September 6–13 next under the presidency of Prof. C. S. Sherrington:—*Section A* (*Mathematics and Physics*): President, Prof. G. H. Hardy; Recorder, Prof. A. O. Rankine, Imperial College of Science and Technology, S.W.7. *Section B* (*Chemistry*): President, Principal J. C. Irvine; Recorder, Prof. C. H. Desch, University of Sheffield. *Section C* (*Geology*): President, Prof. P. F. Kendall; Recorder, Dr. A. R. Dwerryhouse, University College, Reading. *Section D* (*Zoology*): President, Dr. E. J. Allen; Recorder, Mr. R. D. Laurie, University College, Aberystwyth. *Section E* (*Geography*): President, Dr. Marion I. Newbigin; Recorder, Dr. R. N. Rudmose Brown, University of Sheffield. *Section F* (*Economics*): President, Prof. F. Y. Edgeworth; Recorder, Prof. H. M. Hallsworth, Armstrong College, Newcastle-upon-Tyne. *Section G* (*Engineering*): President, Prof. T. Hudson Beare; Recorder, Prof. G. W. O. Howe, Elmswood, Malden, Surrey. *Section H* (*Anthropology*): President, Mr. H. J. E. Peake; Recorder, Mr. E. N. Fallaize, Vinchelez, Chase Court Gardens, Enfield, Middlesex. *Section I* (*Physiology*): President, Prof. E. P. Cathcart; Recorder, Dr. C. Lovatt Evans, National Institute for Medical Research, Mount Vernon, N.W.3. *Section J* (*Psychology*): President, Dr. W. H. R. Rivers; Recorder, Dr. C. Burt, 30 Princess Road, Regent's Park, N.W.1. *Section K* (*Botany*): President, Prof. H. H. Dixon; Recorder, Mr. F. T. Brooks, 31 Tenison Avenue, Cambridge. *Section L* (*Education*): President, Sir Richard Gregory; Recorder, Mr. D. Berridge, 1 College Grounds, Malvern. *Section M* (*Agriculture*): President, The Right Hon. Lord Bledisloe; Recorder, Mr. C. G. T. Morison, School of Rural Economy, Oxford.

MR. E. T. NEWTON, formerly palæontologist to the Geological Survey, has been elected president of the Palæontographical Society in succession to the late Dr. Henry Woodward.

MAJOR-GENERAL THE RIGHT HON. J. E. B. SEELY has consented to accept the office of president of the thirty-third Congress of the Royal Sanitary Institute, to be held at Bournemouth on July 24–29 of next year.

IT is announced in *Science* that Mr. John D. Rockefeller has provided funds for the purchase of the birthplace of Pasteur at Dôle, in the Jura. It will be transformed into a museum, in which will probably be housed an extensive medical and surgical library, with the authentic documents of Pasteur.

A FOSSIL Scopeloid fish with the scales which bore luminous organs especially well preserved has been discovered in the well-known Miocene fish-bed near Oran, Algeria. The fish belongs to the genus Myctophum, and as the arrangement of the luminous organs is clearly seen, its affinities can be determined. According to the discoverer, M. Camille Arambourg (Bull. Soc. Géol. France, sér. 4, vol. 20, p. 237), it is not related to the Mediterranean species, but to one having a wide distribution in the Atlantic, Indian, and Pacific Oceans.

THE council of the Institution of Civil Engineers has made the following awards for papers printed without discussion in the Proceedings of the institution for the sessions 1918–19 and 1919–20, publication of which has been delayed by conditions due to the war:—*Session* 1918–19: A Telford medal to Prof. E. G. Coker (London), a Crampton prize to Mr. F. F. P. Bisacre (Glasgow), a Manby premium to Mr. E. H. Lloyd (Cairo), and a Telford premium to Mr. Rollo Appleyard (London). *Session* 1919–20: A Crampton prize to Prof. F. C. Lea (Birmingham), and Telford premiums to Messrs. A. P. Horne (Aberdeen), S. Blencowe (Buenos Aires), and W. J. Walker and R. Koivulehto (Dundee).

AT the annual general meeting of the Society of Engineers, held on December 12, the following premiums for papers read during 1921 were awarded:—President's gold medal to Mr. G. O. Case for his paper on "The Winning of Tidal Lands in British Guiana"; Bessemer premium to Mr. R. W. A. Brewer for his paper "Some Modern Engineering Practice in America"; Nursey premium to Mr. Alfred S. E. Ackermann for his third paper on "The Physical Properties of Clay"; Society's premium to Mr. W. M. Beckett for his paper on "Northwich Sewerage and Sewage Disposal Works"; and Geen premium to Mr. C. F. Moore, of the Crystal Palace Engineering Society, for his paper on "The Locomotives of the London and North-Western Railway."

THE Physical Society and Optical Society's annual exhibition, which is to be held on Wednesday and Thursday, January 4 and 5, at the Imperial College of Science, South Kensington, will be open in the afternoon (from 3 to 6 p.m.) and in the evening (from 7 to 10 p.m.). Mr. A. A. Campbell Swinton will give a lecture on "The Johnsen-Rahbek Electrostatic Telephone and its Predecessors" at 4 p.m. on January 4 and at 8 p.m. on January 5. Mr. F. Harrison Glew will give a lecture on "Radium: Its Application in Peace and War" at 8 p.m. on January 4. Other discourses are being arranged. We understand that invitations have been given to the Institution of Electrical Engineers, the Institution of Mechanical Engineers, the Chemical Society, the Faraday Society, the Wireless Society of London, and the Röntgen Society. Admission in all cases will be by ticket only, and therefore members of the societies just mentioned desiring to attend the exhibition should apply to the secretary of the society to which they belong. Others interested should apply direct to Mr. F. E. Smith, hon. secretary of the Physical Society, Admiralty Research Laboratory, Teddington, S.W.

A METHOD, which is to be tried at the London Air Station, Croydon, of finding cloud heights at night by means of a searchlight was referred to in the *Times* of December 19. The method is, however, not new. At South Farnborough observations were made in 1916 in connection with a searchlight station about two miles distant from which a vertical beam was projected. The spot of light on the clouds was first observed with a theodolite, but it was often difficult to locate the brightest part in the telescope. A vertical scale was therefore set up against which the light was observed, the eye being placed in a fixed position. If observations are always made from one place the scale may be graduated to read heights directly; it should be black with white graduations. Heights may be determined from lights of distant towns reflected on clouds. The light from London may be seen fifty miles away on very many moonless nights, and may occasionally be photographed, but, as street-lighting is not always very actinic, colour-sensitive plates are required at such distances, and very long exposures, four or five hours with a lens working at f/4·5. The best conditions occur with alto-cumulus clouds at ten to fifteen thousand feet, but a faint glare extending to very considerable altitudes may sometimes be seen on perfectly cloudless nights.

As a preliminary to the proposed standardisation throughout the commerce and industries of France the Government considered the question of the unification of the methods of measurement at the time in use, and issued in 1919 regulations for the introduction of certain new units in the metre–ton–second and centimetre–gram–second systems. The text of these regulations was reproduced in the Bulletin of the Société d'Encouragement pour l'Industrie nationale for November–December, 1919. In the issue of the bulletin for October last the unit of density, that of a body of mass one ton and of volume one metre cube is explained and its relation to older units set forth. The available methods of determining density are described and the errors liable to occur pointed out. As a result of the discussion methods of determination which depend on the balance are recommended instead of those depending on hydrometers. It is further recommended that to avoid all confusion as to the units used the terms "specific mass" be reserved for the density in the metre–ton or centimetre–gram units, and be used in all commercial and industrial statements and tables. The Baumé degree is to be discarded as obscure and indefinite, and therefore prejudicial to French commerce.

So much attention has been directed of late years to the scientific work of Leonardo da Vinci that any discoveries concerning him are bound to interest those occupied with the study of the history of science. Prof. De Toni has been engaged on a biographical sketch of the physicist Giovanni Battista Venturi (1746–1822), whose "Essai sur les ouvrages physico-mathématiques de Leonardo da Vinci" (Paris, 1797) was among the first works to emphasise the importance of Leonardo's scientific position. In the course of investigating the remains of the correspondence between Venturi and other men of science of his time, Prof. De Toni found in the Reggio-Emilia Library three large volumes of transcripts and digests which Venturi had copied from the Leonardo manuscripts in Paris. It soon became evident that these transcripts had been made between 1796 and 1797 before the manuscripts, generally known as A, B, and E, had had torn from them a number of sheets which were afterwards disposed of and many of which were believed to be entirely lost. The manuscript A consisted of 114 sheets and has now only 63, while E consisted of 96 sheets and has now only 80. Much of this material has now been recovered by Prof. De Toni, and consists largely of descriptions of mechanical devices and fortifications, together with biographical and political notes. Prof. De Toni has already communicated an outline of his results to the *Comptes rendus* of the Paris Academy of Sciences (vol. 173, No. 15, October 10, 1921, pp. 618–20). Further more detailed communications by him will appear in the publications of the Instituto Reale of Florence.

AT a joint meeting of the Royal Geographical Society and the Alpine Club on December 20 Col. Howard Bury gave an account of the work of the Mount Everest Expedition. He was followed by Mr. Mallory, who is again to take part in next year's assault on the summit. Mr. Mallory described the conditions which the climber will probably have to face and discussed the possibilities of success. The summit of the mountain is formed by three arêtes. The faces between them are quite impracticable, and the only possible line of advance seems to be to reach the upper part of the north-east arête from the north. Whether it is possible on account of reduced atmospheric pressure to reach the summit is another matter, and on this point Mr. Mallory spoke with caution. He believed it possible for unladen mountaineers to reach 26,000 ft., and did not think the last 3000 ft. would be so much more tiring as to exclude the possibility of reaching the summit. The higher one goes the less is the effect of any given rise, since the atmospheric pressure diminishes less rapidly at increasing heights. On the other hand, Mr. Mallory pointed out that descent is definitely an exertion and means growing fatigue even on gentle slopes, and this was particularly noticeable in the case of the coolies, probably because few of them had learned how to husband their strength. Prolonged exertion at the highest altitude reached, about 23,000 ft., necessitated long rest; this problem will increase the difficulty of the last stages. And if anyone fails towards the summit he will require to be sent down with an escort—a contingency which may be likely to occur and will undoubtedly hamper the prospect of success. Mr. Mallory believes that the chances of success for any particular party are small, but that if the attempt were made year after year the summit eventually could be reached.

THE University of Calcutta has published a useful pamphlet, a translation from the Italian of "The First Outlines of a Systematic Anthropology of Asia," by Prof. V. Giuffrida-Ruggeri, of the Royal University of Naples. It gives a useful summary, with references to authorities and statements of physical measurements, of the most recent work on this subject. It is a welcome indication of the progress of anthropological studies in India that a work of this kind should be appreciated by the authorities of Calcutta University.

MALACOLOGISTS will welcome the appearance, after an interval of more than four years, of another part (No. 24) of the "Monograph of the Land and Freshwater Mollusca of the British Isles," by Mr. J. W. Taylor, of Leeds. The first part of this great work, which is probably the most complete account of any faunal group, was published as long ago as 1894, and its progress since the completion of the third volume in 1914 has been much too slow. The present instalment contains the beginning of the Xerophila group of the Helicidæ, and in text, plain and coloured illustrations, distribution maps, portraits, etc., is fully up to the high standard which is characteristic of the work. All who are interested in the mollusca will wish the author more speedy progress with the rest of his undertaking.

ENTOMOLOGICAL BULLETIN No. 964 issued by the United States Department of Agriculture is devoted to the garden flea-hopper (*Halicus citri*) and its control. This insect is a striking form belonging to the family Capsidæ, and although the male is winged the female is of a different form and generally totally wingless. Leguminous plants appear to constitute its favourite food, and both the adult and young insects suck the sap from punctures which they make in the tissues. Discoloration and wilting are the symptoms produced, and in severe cases of infestation death supervenes. Clean cultivation in order to prevent the hibernation of the insect in weeds was found to result favourably in reducing the numbers of the pest, and is regarded as the most adequate controlling measure so far devised.

IN a paper of unusual interest in the *Journal of Genetics*, vol. 11, No. 2, Miss I. Leitch gives an account of breeding experiments with some of the Princess Beans of Prof. Johannsen. The latter described a mutation having longer seeds, which arose in one of his pure lines, and bred true, showing it to have been homozygous at the time of its origin. This long mutant (M) has now been crossed with its parent form (E). The seeds from the cross, containing F_2 embryos in F_1 seed-coats, show curves of distribution for length ranging from below the lowest limits of the pure line E to the upper limit of M. Further experiments show that a definite new type, X, shorter and broader than E, is segregated out from this cross. The hybrids either split into M, X, and an intermediate type which goes on segregating, or they do not split at all; and the ratios indicate that a simple Mendelian difference is involved between M and E. The mutant type is found to differ not only in length of seed, but also in producing fewer seeds, and in being more liable to fungus attack. It is pointed out that the theory of loss of factors does not account for the nature of this mutation, and it is suggested that the absence of segregation, as described in certain cases, may have a cytological basis.

THE extensive series of memoirs brought together by Dr. Emil Abderhalden under the title of "Handbuch der biologischen Arbeitsmethoden" includes, as Abteilung 10, Heft 2, an illustrated work by O. Abel, of Vienna, on the methods of palæobiological research (Urban and Schwarzenberg, Berlin, 1921, 30 marks). The external forms, adapted for special modes of life, exhibited by living animals are freely used as aids in restoring fossil remains. Striking examples of convergence are also given, where similarity of habit has induced an external similarity which might easily mislead where hard parts are alone preserved. Heilmann's walking Archæopteryx, compared with the dinosaur Ornitholestes, is interestingly reproduced, but is surpassed by the author's own reconstruction of a pterodactyl on a branch in the attitude of an Indian bat. The appeal throughout is from the fossil to the animate world, and under the influence of these pages we may see Machairodus stealing through our museum corridors, Belemnoids shooting backwards to pierce the entanglement of algæ, and Coccosteus eluding study by a wave of its long-drawn tail. In Lieferung 28, which forms Heft 1 of the same Abteilung, Th. Arldt, of Radeberg, treats of the methods of palæogeography. Palæontology is here called in as an ally, but it must work hand-in-hand with considerations of general geology. None of the published palæographic maps are reproduced, perhaps on account of their lack of resemblance to anything on the earth at the present day. This is, of course, due to our ignorance of topographic details, and the author is modestly content with a general essay on how to approach a very difficult subject.

MR. R. LLOYD PRAEGER's account of the genus Sedum as found in cultivation, which fills 314 pages of the recent issue of the Journal of the Royal Horticultural Society (vol. 46, May, 1921), will interest the botanist as well as the gardener. The genus is widely spread throughout the northern hemisphere, mainly in temperate countries or on the mountains in lower latitudes, reaching the equator on the mountains of Central Africa and South America. About 500 species are at present known to the botanist. Mr. Praeger has, to the best of his ability, ransacked the gardens of the world, and has received and grown no less than 151 species, of each of which he gives a full description with a good illustration showing the habit of the plant and structural details of leaf and flower. Of this number only about twenty-seven are usually found in English and Continental gardens, though many of the rarer ones are of considerable interest or beauty. Further, there are great possibilities; among the many hundreds of new plants described in recent years from China, especially from the scarcely accessible western provinces, are at least ninety new species of Sedum which are known almost entirely from dried specimens in the herbarium. Mexico, which is now known to be extraordinarily rich in Sedums, was until recent years a *terra incognita,* and many handsome species are in cultivation at Washington and elsewhere, though almost unknown in European gardens. The Sedums are notorious for the ease with which a scrap will take root and grow; in many species detached leaves will produce a bud and root from their base, which speedily form a new plant. They are also very easy to cultivate, and few plants are better fitted to endure adverse conditions of soil and moisture.

A MAP to show the chief sources of metals in the British Empire with diagrams of production for 1918 has been prepared under the direction of the Mineral Resources Committee of the Imperial Institute (Messrs. G. Philip and Son, 5*s.* 6*d.* net, on paper). The sheet, measuring 35 × 44 in., contains a map of the world, excluding high latitudes, on Gall's projection, a number of inset maps, and diagrams of output for the chief metals and metallic ores. It is executed on a bold scale with a view to its utilisation as a wall-map for reference and educational purposes. One striking effect of the diagrams is to make it evident that, except in respect of gold, nickel, and perhaps tin, the British Empire output of no metal amounts to 50 per cent. of the world's output; in many cases the proportion is much lower. It is a pity that the figures for a more normal year could not have been utilised.

CAPT. J. B. L. NOEL has recently laid before the Royal Geographical Society some notes from his own experience on the photographic equipment and methods of work for travellers. These notes are offered as an addition to the instructions already contained in the society's "Hints for Travellers," and are well worth the study of anyone interested in the subject. For general purposes he advocates a quarter-plate camera, made of metal if possible, but otherwise well brass-bound, as giving better results with modern anastigmats and later enlargement to whole-plate size, than photographs of this size taken direct, with a great saving in both portability and rapidity of action. The tripod, however, should be as constructed for whole-plate cameras, and may easily be provided with an azimuth circle and compass. The lens should be a convertible anastigmat with a between-lens shutter. For special "instantaneous" photography the reflex camera is replaced by a vest-pocket fixed-focus camera, which is the acme of portability and simplicity. The author deals also with orthochromatic modifications, kinematography, and sundry other matters. "Development," he says, "should always be carried out in the field within about fourteen days of exposure, and within six days in tropical countries."

LONG-RANGE forecasts issued officially in the early part of the autumn have, beyond doubt, been most thoroughly appreciated by the general public. The forecasts, issued on September 26 and 28, scarcely surprised those who have carefully watched the progress made by the Meteorological Office in recent years, although the venture was bold. The *Meteorological Magazine* for November contains an explanation of the long-range forecasts made, and deals with the weather conditions which led to the forecast, giving in detail the weather which followed. The circumstances are set out by Mr. E. V. Newnham, who is engaged in the Forecast Branch of the Meteorological Office. An anticyclone was centred over the British Isles and low-pressure systems existed over Iceland as well as in Scandinavia and in the neighbourhood of the Azores. The occasions of similar conditions in September were tabulated for several years, and the duration of later fine weather was noted for stations in England south of the Mersey and Humber. The time elapsing before the complete break up of the fine spell over eastern England was only in one instance less than a fortnight. In the recent September long-range forecasts there was a temporary break in the south-west in some places on the seventh and eighth days. In northern England appreciable rain fell on the eighth and ninth days. Over eastern and central England south of the Humber a definite break-up had not occurred on October 14. The ten-day forecast issued on September 26 for the southern half of the kingdom was not altogether a success, but the fourteen-day forecast for the eastern and central parts of England issued on September 28 was decidedly successful. Beyond doubt similar forecasts will be made in the future as opportunity is afforded.

"THE British Journal Photographic Almanac" makes its appearance as usual, and continues to be the indispensable book of reference for all who are in any way concerned with the practice of photography. The editor has few notable departures to chronicle for the past year. The chief of those mentioned is the process of desensitising exposed plates so that development may be carried on in a much brighter light than is otherwise permissible. In the "Epitome of Progress" attention is directed chiefly to practical details, as the more strictly scientific matters are now being systematically recorded in "Photographic Abstracts" prepared by the Scientific and Technical Group of the Royal Photographic Society. We congratulate the editor on his "History in Brief of Photographic and Photo-mechanical Processes," for no one can properly appreciate any subject unless he is acquainted with at least the outlines of its history. The tables given in this almanac are so numerous that some of the older ones have occasionally to be omitted to make room for others, but the omission is largely compensated for by a list of those not included, with the most recent year of the almanac in which each may be found.

A CHEMICAL examination of a Babylonian glass vase of a date approximately 1000 B.C. is described in the *Chemiker Zeitung* of November 15 by Dr. F. Rathgen. It appears to have been formed by the application of soft glass to the outside of a clay shape, and has been but little attacked by the soil-water. The glass was white and opaque, the presence of microscopic white fused spherules being observed. Analysis gave silica, 73·32; alumina, and ferric oxide, 11·78; calcium oxide, 5·86; potassium and sodium oxides, 4·46; and cupric oxide, 3·88. The vase was decorated by oval to circular lenticular pieces of glass fused on the body. A piece of magnesite from the same period showed borings which indicate the use of a tubular boring instrument with the addition of an abrasive, possibly quartz. Such instruments, belonging to the Neolithic period, have previously been described. A finger-ring of metallic tin is also referred to. A method of detecting indigo in coloured fabrics, depending on its sublimation in a current of carbon dioxide at 230° C., showed its presence in the garment of an Egyptian princess of the year 1000 B.C.. *Indigofera argentea* occurs in Egypt.

GENERALLY speaking it is found more economical to utilise the whole of the available head in a reservoir system intended for domestic water supply to overcome the frictional resistance in the supply mains, rather than to attempt to use it also as a source of power. Occasionally, however, where multiple reservoirs are used, and where these are at different elevations, or where a constant flow of compensation water is available, it is possible to develop an appreciable amount of power at the expense of a head which would otherwise be wasted. An interesting example of this is to be found in connection with the waterworks of the Bradford Corporation in the higher reaches of the Nidd. Here advantage has been taken of an existing high-level reservoir at the head of the Nidd Valley. The new reservoir is now under construction at a lower level, and the discharge from the higher reservoir is being utilised to drive a hydro-electric plant, which will supply the power required for operating the ropeways, cranes, crushers, and other machines required for the building of the dam, and for lighting the improvised village where the workers will live. The power-house contains two 300 h.p. turbines, each directly coupled to a three-phase alternator of 200 kw. capacity at 2200 to 2400 volts. Messrs. Vickers, Ltd., have been responsible for the construction of the hydro-electric scheme.

Our Astronomical Column.

THE JANUARY METEORS.—Mr. W. F. Denning writes:—"The opening nights of every New Year are marked by an abundance of meteors, though they vary in number at different returns, and are sometimes altogether obscured by clouds. The best time to look for them at their next appearance will be in the two hours preceding 7 a.m. on January 4, but they may also be plentiful on the morning and evening of January 3. This particular shower furnishes conspicuous objects with long flights of moderate speed. The radiant point is usually in 230°+54°, and this is near the northern horizon at about 8.30 p.m. An hour before sunrise, however, the position is high in the north-east and situated far more favourably for the distribution of meteors.

"This particular system has not been hitherto associated with any known comet, but it is highly probable that it is connected with some body of this kind which existed in past times, and possibly exists to-day."

The shower appears to have become definitely visible at an earlier period than usual at this return.

On December 20 a bright meteor was seen by Miss Cook at Stowmarket and by Mr. F. Sargent at the University Observatory, Durham. A comparison of the recorded paths indicates the radiant point at 229°+60° and the height of the object from 72 to 55 miles over the region of Surrey.

On December 23 several meteors, including a brilliant one at 8 p.m., were observed from Bristol from the same shower, and there seems no doubt that the display of Quadrantids is prolonged over a rather considerable period, though it furnishes a really abundant display over a few hours only.

THE FURTHEST CLUSTER.—The cluster N.G.C. 7006 has the distinction of being the most remote celestial object of which the distance has been determined in a manner that inspires some confidence. Dr. Harlow Shapley and Miss B. W. Mayberry contribute an article on it in Proc. Nat. Acad. Sci., May, 1921. It is on a line from α to γ Delphini, prolonged to twice the distance between them. The distance in kiloparsecs by five independent methods is given as follows:—

Distance kp.	Method.
67	Parallax-diameter correlation.
71	Photog. magnitude brightest 25 stars.
62	Photo-vis. magnitude brightest 38 stars.
63	Integrated visual magnitude.
69	Median magnitude of 11 Cepheids.

The mean of all the methods gives 66·4 kiloparsecs, or 217 thousands of light-years.

The first and fourth methods have little *a priori* weight, and are merely used because experience shows that the linear magnitudes and absolute luminosities of globular clusters vary only between narrow limits.

In the fifth method the measured median magnitude is 18·96, and the assumed absolute magnitude is −0·23, derived from the study of similar stars in other clusters.

The assumption that there is no sensible absorption of light in the intervening space is supported by the fact that the colour indices of the brighter stars are quite comparable with those of stars in the sun's neighbourhood. Absorption would tend to make them redder.